



Validating the presence of Spanish Flag, *Gonioplectrus hispanus* (Cuvier, 1828) (Perciformes, Serranidae), from the south-western Gulf of Mexico

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Abstract

We report the presence of *Gonioplectrus hispanus* (Cuvier, 1828) in Mexican waters of the Gulf of Mexico. Four specimens (198–224 mm standard length) were caught at two locations south of Veracruz. These records increases the number of species in the family Serranidae for Mexico to 113. We include morphometry and meristic data of our specimens.

Keywords

Chernas, Epinephelinae, grouper, range extension, species distribution

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Introduction

The family Serranidae Swainson, 1839 is a monophyletic group and includes six subfamilies, 72 genera, and between 579 and 583 species (Fricke et al. 2020; Parenti and Randall 2020). This family has significant economic importance, as it supports commercial fisheries and sport fishing activities (Bullock and Smith 1991). In Mexico, it supports one of the main fisheries in the Western Atlantic (Colás-Marrufo et al. 1998), and it is also important

in coastal, tropical and subtropical ecosystems, including mesophotic and rariphotic environments (Bullock and Smith 1991; Baldwin et al. 2018). One of the genera within the family is *Gonioplectrus* Gill, 1862, which is monotypic, with *Gonioplectrus hispanus* (Cuvier, 1828), Spanish Flag, restricted to Western Atlantic (Parenti and Randall 2020).

Gonioplectrus hispanus has a wide distribution from

North Carolina (USA) to south-eastern Brazil. However, the records of this species are scarce because it inhabits rocky areas and deep coral from 60 to 365 m (McEachran and Fechhelm 2005). The north-western distribution of this species includes the Gulf of Mexico, Texas, and other parts of the United States (Briggs, 1958; Briggs et al. 1964; Moore 1975; Smith 1976; Bullcock and Smith 1991; Hoese and Moore 1998). There are no confirmed records based on deposited specimens in reference collections from Gulf of Mexico and the Mexican Caribbean, although it is mentioned in the faunistic lists of Mexican Atlantic coasts (Lara-Domínguez et al. 1993; Baqueiro and Mendez 1994), including the coast at Los Tuxtlas (Schaldach et al. 1997) and as larvae on Campeche Bank (Flores-Coto et al. 2009). The only evidence of its presence in Mexican Atlantic coasts is a photograph of a single specimen in the Instituto Nacional de Pesca (1976). The geographic coordinates of the collection site of this specimen are unknown. With the new records presented here, we confirm the presence of *G. hispanus* in the south-western Gulf of Mexico.

Methods

Four specimens of *Gonioplectrus hispanus* were caught accidentally by the artisanal fishery, using a bottom-longline made with nylon monofilament and 60 to 150 hooks (size 6) at depths of 180–300 m (Fig. 1). The specimens were deposited in the Ichthyological Collection of the Facultad de Estudios Superiores Iztacala (CIFI), Universidad Nacional Autónoma de México. The taxonomic

determination was made with specialized keys by Bullcock and Smith (1991), McEachran and Fechhelm (2005), and Heemstra et al. (2002). Electronic calipers (0.01 mm) were used for morphological measurements, and the meristic data were counted according to Hubbs and Lagler (1958) with modifications for the group (Betancur-R. et al. 2001; Oliveira and Barbosa 2010; Sampaio et al. 2017).

Results

Family Serranidae Swainson 1839

Genus *Gonioplectrus* Gill, 1862

Gonioplectrus hispanus (Cuvier, 1828)

Figure 2; Table 1

Common names. Spanish Flag; mero payaso, payasín (Spanish).

New records. MEXICO – **Veracruz** • Gulf of Mexico; ca. 11.8 km from Punta Puntilla, municipality of Ángel R. Cabada; 18°46'56.7"N, 095°09'40.2"W; 280 m depth; 12.XI.2020; A. Campos-Pérez and E. Campos-Vicente leg.; fishing line; 2 specimens, CIFI-1715 (192 and 208 mm SL) • same locality, 300 m depth; 09.I.2021; A. Campos-Pérez leg.; fishing line; 1 specimen, CIFI-1801 (224 mm SL) • Gulf of Mexico; ca. 9 km from Playa Hermosa, municipality of Ángel R. Cabada; 18°44'28.8"N, 095°04'52.0"W; 180 m depth; 24.VI.2021; A. Campos-Pérez and E. Campos-Vicente leg.; fishing line; 1 specimen, CIFI-1820 (208 mm SL).

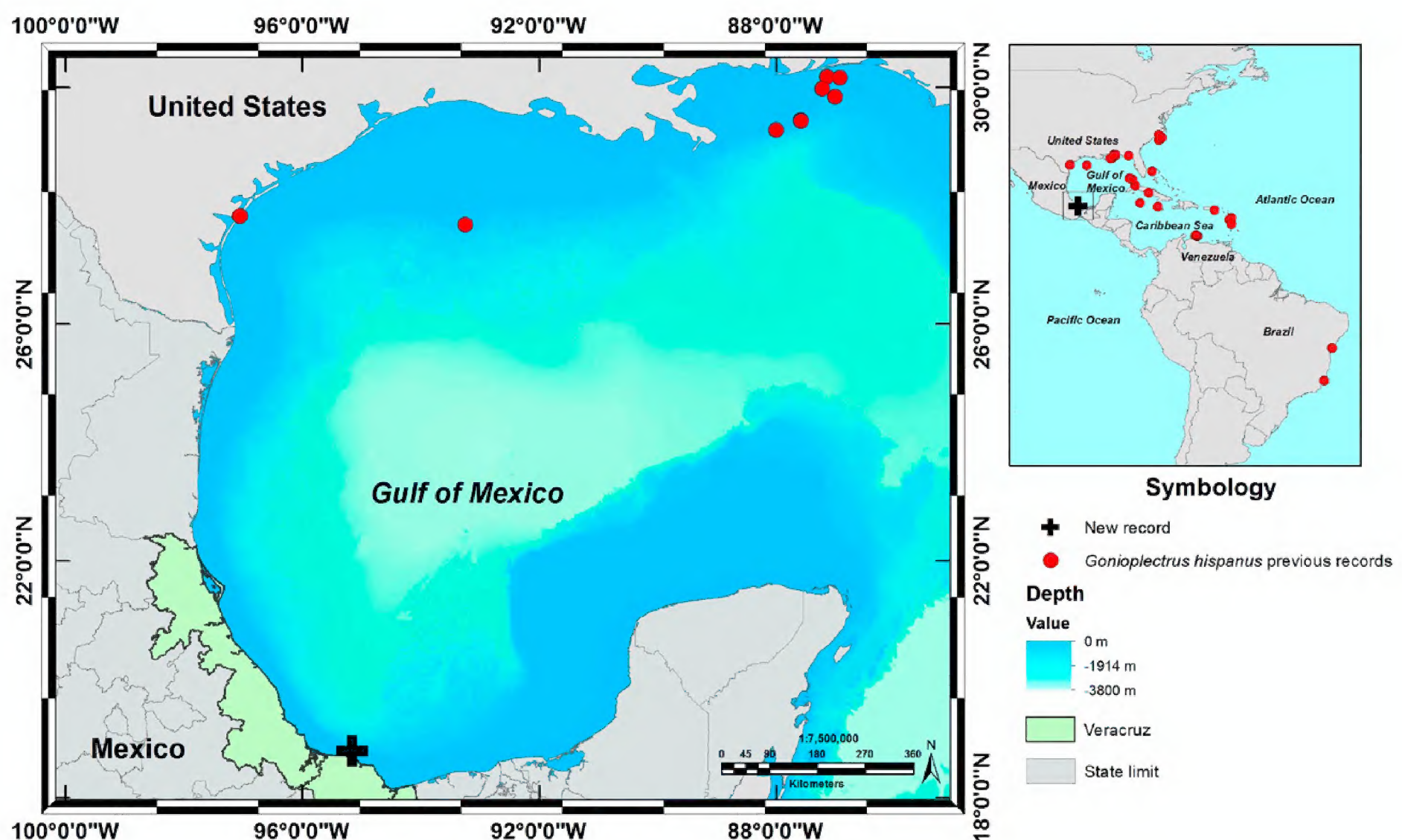


Figure 1. Sampling station of *Gonioplectrus hispanus* (black cross), ca. 11.8 km from Punta Puntilla, municipality of Ángel R. Cabada, Veracruz, south-western Gulf of Mexico (18°46'56.7"N, 095°09'40.2"W). Previous records of *G. hispanus* in the western Atlantic (red dots).



Figure 2. *Gonioplectrus hispanus* (CIFI-1715, 208 mm SL) collected in the south-western Gulf of Mexico, showing typical coloration for the species. The species was determined prior to the preservation of the specimen. Scale bar = 25 mm.

Identification. *Gonioplectrus hispanus* is recognised by its a serrated preopercle with a large spine on the ventral edge directed forward. The opercle has three spines, and the second spine is most elongated. The dorsal fin has 8 spines and 11–13 rays, and the anal fin has 3 spines and 7 rays. The lateral line has 47–49 scales. The bases of the dorsal, anal, and pectoral fins are covered with scales. Gill rakers number 21–23. In addition, in vivo, *G. hispanus* shows a striking pink coloration, with seven bright yellow stripes on the sides from the head to the base of the tail fin. A diagonal yellow stripe runs from the snout through the eye and upper opercle to the back of the body. There are yellow patches in the interorbital region and cheek. The pelvic fins are violet, and the anal fin has a crimson spot from the second anal spine as far as the first anal ray. There is a conspicuous, white, ventral blotch, which is much larger than the eye-diameter.

Discussion

Gonioplectrus hispanus occurs in moderately deep waters down to depths of 460 m (Oliveira and Barbosa 2010; Baldwin et al. 2018) and co-exists with other seranids, usually at the periphery of tropical reefs (Bullock and Smith 1991). Specifically, it lives in coral reefs of the rariphotic zone (139–309 m; Baldwin et al. 2018). This species has no value as human food due to its small size, but it is often used as ornamental fish in the aquarium trade (Oliveira and Barbosa 2010). Its capture is difficult below 100 m, and barriers, such as thermoclines at these depths, function as biological boundaries (Heemstra and Randall 1993; Oliveira and Barbosa 2010).

The species has been recorded sporadically along

Table 1. Morphometric and meristic data of specimens of *Gonioplectrus hispanus* from the south-western Gulf of Mexico.

Morphometrics (mm)	CIFI 1715	CIFI 1715	CIFI 1801	CIFI 1820
Total length	251	230	278	271
Standard length	208	192	224	222
Head length	88.66	82.21	96.06	93.82
Upper jaw length	39.47	37.06	42.25	43.97
Orbit diameter	15.78	15.35	16.03	16.24
Postorbital length	48.54	45.47	56.19	52.47
Interorbital width	14.70	12.62	16.13	15.84
Snout length	22.42	21.01	25.81	26.95
Suborbital length	9.53	8.55	11.20	11.48
Body depth	81.91	74.97	96.90	87.30
Caudal peduncle length	33.07	28.96	31.29	28.65
Caudal peduncle depth	32.58	30.70	33.78	34.92
Caudal fin base length	40.32	36.95	38.26	36.42
Dorsal fin base length	94.08	87.82	97.99	98.45
Anal fin base length	34.79	31.08	37.55	36.39
Predorsal length	84.15	81.70	93.45	96.12
Preanal length	144	134	156	15
Prepectoral length	84.11	74.2	87.96	85.13
Pectoral fin length	52.60	51.01	64.61	59.72
Prepelvic length	89.18	79.97	96.93	89.92
Pelvic fin length	42.61	41.66	46.10	46.51
Meristics				
Dorsal fin spines	VIII	VIII	VIII	VII
Dorsal fin rays	11	13	13	13
Anal fin spines	III	III	III	III
Anal fin rays	7	7	7	7
Pectoral fin rays	16	15	16	17
Caudal fin rays	16	17	17	17
Pored scales lateral line	49	48	48	50
Lateral line scales	85	81	79	83
Scales around the caudal peduncle	47	45	45	48
Upper gill rakers	6	7	6	5
Lower gill rakers	15	15	15	15

the Caribbean coasts of Colombia and Venezuela, as well as in the Caribbean Islands (Cervigón 1971; Guitart 1977; Thompson and Munro 1978; Betancur-R. et al. 2001; Baldwin et al. 2018). It has been recently recorded in Brazilian waters as a result of deep-sea fishing and mesophotic exploration (Oliveira and Barbosa 2010; Garcia-Júnior et al. 2015; Sampaio et al. 2017). Bullock and Smith (1991) reported this species in the north-western Atlantic, and in Mexico, it has been detected in the southern Gulf of Mexico, between Laguna de Términos and the Yucatán Peninsula, although the location was not specified (Lara-Domínguez et al. 1993). Despite recent ichthyofaunal surveys in reef areas in the south-eastern Gulf of Mexico and on the Yucatán continental shelf, *G. hispanus* has not been detected (Colás-Marrufo et al. 1998; Robertson et al. 2019; González-Gandara 2020).

Its occurrence in Punta Puntilla is probably due to the dispersal of larvae, which influences the presence of adults on coral reefs. Kendall and Fahay (1979) captured larvae of *G. hispanus* in North Carolina, which represents the northernmost record. However, in Mexico, there is a gap in the knowledge of deep communities compared to other countries where this species occurs (Simon et al. 2016; Baldwin et al. 2018; Chasqui-Velasco and González-Corredor 2019) due to poor sampling efforts and the difficulty sampling mesophotic and rariphotic environments. Our new data of *G. hispanus* are an important contribution to understanding Mexico's mesophotic and rariphotic ichthyofauna, and confirm the presence of this species in the southwestern Gulf of Mexico.

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Authors' Contributions

Conceptualization: LFDM. Data curation: VREA. Formal analysis: LFDM, ELS, MLJB, VREA. Visualization: ELS, VREA. Writing – original draft: LFDM, ELS. Writing – review and editing: LFDM, MLJB, VREA.

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